Proposed Woodland Road Application for Permit

Supporting Documentation

Prepared for:

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TABLE OF CONTENTS

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PART ONE: ALTERNATIVES ANALYSIS

Introduction

Woodland Road LLC is proposing the construction of Woodland Road and is the applicant for the Michigan Department of Environmental Quality (MDEQ) permit under Part 301 (Inland Lakes and Streams), Part 303 (Wetlands), and Part 31 (Water Resources Protection-Floodplains) of the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (PA 451) and the administrative rules adopted under those Parts. The proposed Woodland Road will be a multi-purpose road open to public use and is deemed significant to the transportation needs of economic development in Marquette County, as explained in this document.

The transportation needs of northwest Marquette County have been carefully evaluated for the mining, logging, and aggregate industries and related services as well as for general public access. The economic benefits of the proposed Woodland Road to Marquette County and the entire region are such that construction of the proposed road is a necessity.

As the road planning progressed more benefits for the road were brought forth and more stakeholders became involved in the project. Discussions with local community leadership identified the strong public interest benefits and economic growth considerations of the Woodland Road project, which led to the formation of the Woodland Road LLC for the purpose of being the applicant for the MDEQ permit. Woodland Road LLC members include the Michigan Forest Products Council; Kennecott Eagle Minerals Company; A. Lindberg & Sons, Inc.; and, Mr. John Jilbert.

The Michigan Forest Products Council is the leading trade organization representing the State of Michigan's entire forest products industry, including landowners, foresters, sawmills, and a large and diverse array of wood product manufacturers. The Council is widely recognized as the voice of the forest products industry in Michigan. More information may be obtained from its website at www.michiganforest.com.

Kennecott Eagle Minerals Company (KEMC) is a subsidiary of Rio Tinto, which is a global leader in finding, mining, and extracting the world's metals and minerals that are essential for making thousands of everyday products used in our society. KEMC is developing the Eagle Mine in northwest Marquette County.

A. Lindberg & Sons, Inc. (AL&S) is a large heavy construction and aggregate supplier company located in Ishpeming, MI and has a number of large quarries and pits that produce aggregate products for numerous private, governmental, commercial, and industrial customers in the central Upper Peninsula.

Mr. John Jilbert is a local businessman that owns a large acreage of land in northwest Marquette County.

Public comment during the Eagle Mine permitting process and also at City of Marquette public hearings on city street truck restrictions showed a clear preference for a new north-south road in western Marquette County. This public input and community support for assessing alternatives to using existing county roads for access to the northwest part of Marquette County resulted in a comprehensive evaluation of the alternatives for providing the needed improved access to this region. Subsequent detailed studies regarding the alternatives for improved road access in this area clearly indicate the most feasible and prudent alternative is the construction of a new road and not the utilization of existing county roads. The substantial public and private benefits of the proposed Woodland Road further justify this proposed project.

This analysis of alternatives for the construction of a 22.3-mile long road from US-41 in Humboldt Township north to the area of the intersection of Trail 5 and Triple A Road ("north terminus") is a vital component of the application for permit to the MDEQ. A project team comprised of AL&S, Coleman Engineering Company (CEC), STS Consultants (now AECOM), King & MacGregor Environmental, Inc. (KME), and other subcontractors worked together to evaluate the alternatives described in this document.

Landowners where the road would be located outside of existing county road rights-of-way have agreed to allow the proposed road on their property, which is considered a significant contribution to the project. The proposed road will require an easement from the State of Michigan for the portion of the road on state land northeast of the Yellow Dog River up to Triple A Road. The application for the easement has been submitted to the Michigan Department of Natural Resources (MDNR) and is in process of review. If the State land route cannot be utilized, the proposed road would have to be routed west and north from the existing crossing of the Yellow Dog River and would unavoidably impact about three acres of wetland and would impact areas of narrow-leaved gentian, a threatened plant species in Michigan.

The proposed Woodland Road would be a multi-purpose road that is open to public use to serve the following important purposes:

- Primary access route for transporting equipment and ore, employee access, and contractor and agency personnel access;
- Logging company access for timber harvest areas, for land management (timber assessment, planting, etc.), and for transporting logs and wood chips to mills;
- Transportation route for suppliers and producers of aggregate products and rock;
- Emergency services access route, including fire, police, and EMS to public lands and private properties;
- Public access to recreational land and private landowners to access their property;
- Reduction of heavy haulage trucking on public roads in more developed or urbanized areas of Marquette, Negaunee, and Ishpeming; and
- Minimal expenditures of public funds for road construction, operation, and maintenance.

It is inherent in the location and design of the Woodland Road to be a safe road for public travel, given the intended users, as is explained in detail in this document.

Project Purpose

A prerequisite to the evaluation of alternatives under the requirements of Part 303 is the statement of the project purpose, which defines the scope of the alternatives analysis. Therefore, only the alternatives that will achieve the project purpose are evaluated by the applicant for consideration by the MDEQ. The project purpose for this project is: ***To construct a multi-purpose road to connect key industrial, commercial, and recreational areas in northwest Marquette County to US-41.***

Alternatives Considered

The area to be served by the proposed Woodland Road is termed in this document as the "Project Service Area" and is the area reasonably expected to benefit from the improved transportation efficiencies provided by the proposed road (Figure 1). The Project Service Area is comprised of the lands north of US-41 in Townships 47N through 51N and Ranges 28W through 29W in Marquette County and is approximately 300 square miles in size.

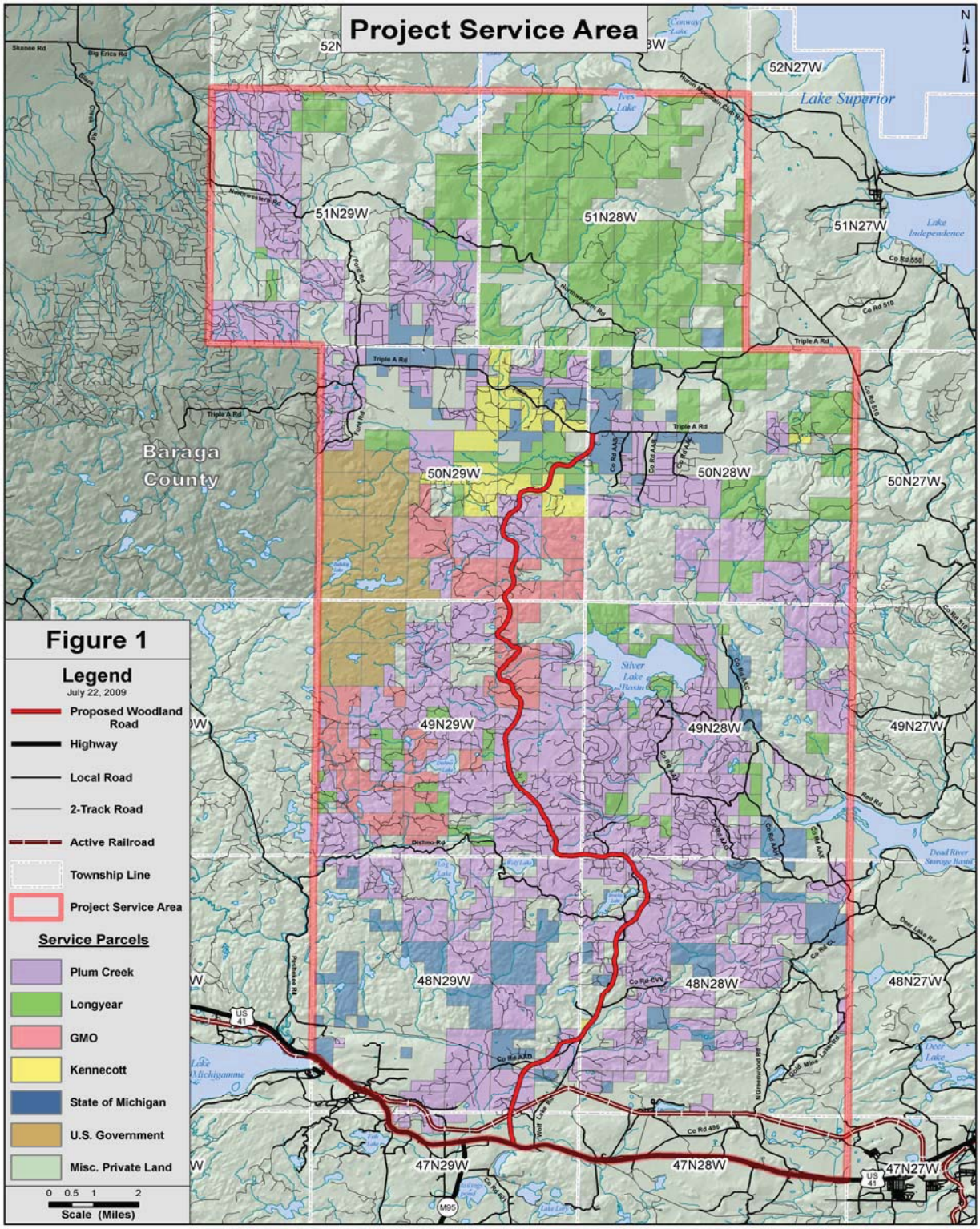
One overriding factor in seeking a new transportation route to serve northwest Marquette County is the input of the general public and community leaders that have expressed a need to reduce heavy haulage on public roads in urban areas as is feasible. The City of Marquette has been actively evaluating truck traffic on public roads in the city. Marquette Township, the cities of Negaunee and Ishpeming, and Marquette County, with input from the Michigan Department of Transportation, have also been involved to some extent in trying to plan for traffic levels in their respective jurisdictions. The proposed Woodland Road is intended to reduce the number of heavy trucks on public roads in these urbanized areas while improving operating efficiencies and access to the economic activity in the Project Service Area. The alternatives to the proposed Woodland Road project are assessed in this document.

Significant logging operations are conducted in the Project Service Area on an ongoing basis. To service these operations, many types of large equipment are transported to/from the timber company lands, including harvesters, skidders, bulldozers, chippers, large tractor/trailers, dump trucks, excavators, tool trailers, and fuel trucks. Heavy equipment maintenance service providers, pickup trucks, and ATVs also use existing roads and trails in the Project Service Area. Activities include not only timber harvest, but tree planting, access road building, timber cruising, and other land management activities.

Figure 1 depicts the ownership of major landowners in the Project Service Area. Also there are significant logging operations on other private properties and on State of Michigan lands in the Project Service Area. State lands in the Project Service Area are also shown on Figure 1.

Mining activity is also on the increase in the Project Service Area. The value of mining in the Project Service Area to the State of Michigan for royalties, infusion of capital into the local, state, and national economies, and many other direct and indirect benefits of mining are important to the economic viability of the central U.P.

Figure 1. Project Service Area and Large Landowner Map.



Aggregate supply and production are other active commercial uses ongoing in the Project Service Area. Maintenance and construction of logging access roads and landings, as well as private landowners' needs and maintenance of county roads all require the transportation of aggregates, including road gravel and rock riprap. A major producer with facilities in Marquette County is A. Lindberg & Sons, Inc. of Ishpeming, Michigan. Humboldt Stone is owned by AL&S and has property formerly owned by Humboldt Mine. Many other smaller excavation contractors also serve the timber industry and other customers in the Project Service Area and numerous borrow pits are located throughout the Project Service Area. Access on a well-maintained and constructed road from US-41 into the Project Service Area would be highly beneficial to the aggregate industry in northwest Marquette County.

As public and private uses in the Project Service Area have increased over the years, the demand for emergency services has also increased. A reliable access route for fire, police, and EMS vehicles into the Project Service Area is very important to public safety. Recreation traffic is presently significant in the Project Service Area; therefore the construction of Woodland Road will improve access for recreation. Access to lands open to public use by fishermen, hunters, berry pickers, mushroomers, bird watchers, hikers, and sightseers will be facilitated and improved by the Woodland Road. The North Country Trail crosses the proposed Woodland Road between the Dead River and Wildcat Canyon Creek. A local hiking group called "North Country Trail Hikers" supports the new road as it would provide better access to the North Country Trail. Improved landowner access is another important attribute of the proposed road.

It is important to note that all wetlands within the project limits have been accounted for in the evaluation of wetland impacts for the proposed Woodland Road. There has been no distinction between regulated or non-regulated wetlands under the jurisdiction of Part 303 nor has there been any separation of non-jurisdictional wetlands according to federal regulations. If the regulated or non-jurisdictional wetlands had been removed from this proposed project, the acreage of wetland impacts that require mitigation might be reduced. The actual on-the-ground wetland delineation that was conducted for the proposed Woodland Road corridor revealed a larger acreage of wetlands than is depicted on the National Wetland Inventory (NWI) maps. Therefore, the wetland impacts of the alternative routes are probably underestimated due to the fact that NWI was used to estimate wetland impacts for the alternatives and actual delineations within those alternative route corridors were not conducted.

Citizens from the Village of Big Bay, the City of Marquette, and those that live along or near County Road 550 have requested through signed petitions that an alternate route for truck traffic be found. Numerous alternatives have been carefully evaluated for a proposed multi-purpose road from US-41 on the south to Triple A Road on the north (herein referred to as the "north terminus"). These alternatives involve route locations that were evaluated for the road to serve the Project Service Area. Figure 2 is a map of the alternatives considered. Each alternative is described in the following text.

No-Action Alternative

The no-action alternative must be a part of the evaluation of alternatives and is described as: *To use existing public roads with little or no improvements to transport commercial products to/from the Project Service Area and for access by employees, service personnel, contractors, and emergency services.* The route considered for the no-action alternative would be described as follows: from US-41 to Wright Street to Sugar Loaf Avenue to CR 550 to CR 510 to the north terminus on Triple A Road.

If roads in the no-action alternative are not upgraded, the following concerns must be addressed:

- Road alignments that presently exist on Triple A Road and CR 510 are inadequate, particularly in regard to heavy truck traffic, in that these roads are narrow and include sharp curves, inadequate shoulders, steep grades, and poor sight distances.

- The use of existing public roads for transporting ore, timber, aggregates, and all users associated with these commercial activities would place a financial strain on the Marquette County Road Commission (MCRC) due to increased maintenance that would be required on these roads, including grading, dust control, and asphalt repair/replacement. In addition, winter plowing would be required on portions of this route that are not presently maintained in winter.

- Residents that live on this route are likely to have concerns about the noise and increased traffic that would result from the use of this route.

Most of the roads in the No Action Alternative would need to be reconstructed to allow safe transportation by large trucks. Since the existing roads cannot be used in their current condition to safely meet the transportation needs this alternative is not acceptable. Based on the fact that mining, timber harvest, and aggregate transport activity will increase in the Project Service Area, a feasible and prudent alternative must be utilized to provide for these transportation needs if the economic benefits of these activities are to be realized.

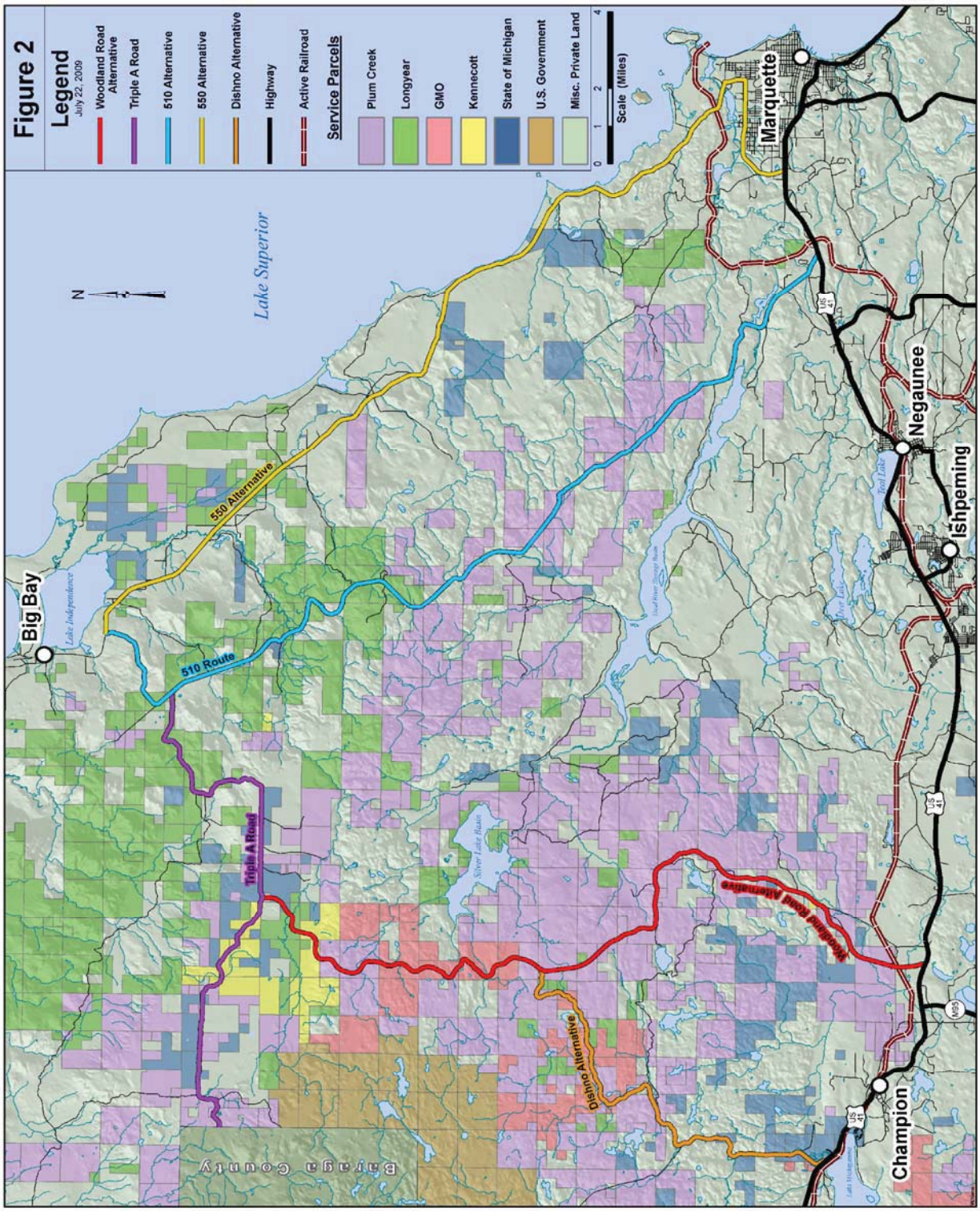
Alternative 1. Railroad

A railroad route through the Mulligan Plains is the only potential location for a railroad to be constructed to traverse the grade changes on the landscape between US-41 and the north terminus on Triple A Road (Figure 2). However, there is a Conservation Easement in place on the north end of the Mulligan Plains at the Yellow Dog River, Sections 21 and 28, T50N-R28W (Appendix A), which precludes the construction of a railroad to connect the north terminus on Triple A Road to US-41.

The other private and public, commercial and non-commercial users of the proposed route would be unable to use a railroad to meet their transportation needs. Timber companies would have to haul logs from harvest areas on roads to railroad sidings both constructed for the purpose of loading logs on the train. This would be extremely inefficient and would result in additional road building and disturbance on the land to access the railroad. Aggregate suppliers/producers would be similarly not served by a railroad, as well as all of the other public and private uses of the Project Service Area.

For all of the reasons listed above a railroad is otherwise not practicable, feasible, or prudent and therefore this alternative has been rejected.

Figure 2. Alternative Routes Considered.



Alternatives 2, 3, 4, and 6. Description of Uses and Market Destinations

Alternatives 2, 3, and 4 would involve transporting ore, forest products, and aggregate/rock primarily on existing roads to connect US-41 with the north terminus on Triple A Road. Alternative 6 will involve transporting these commercial products on the proposed Woodland Road, which is a much more direct connection from US-41 to Triple A Road. The many attendant users associated with mining, logging, and aggregate activities (i.e. employees, contractors, service personnel, etc.) will also be using the alternative routes described in the following sections.

An important consideration in evaluating alternatives for the proposed Woodland Road is the type of trucks that would use the road, the number of trips expected, and the benefits of the proposed road to meet transportation needs. The transportation needs for mining, timber harvest, and aggregates are described in the following discussion. The distance comparisons in the alternatives described below are more readily made for transportation related to mining due to the fact that the approximate tonnage to be hauled is a known factor. For transportation related to the timber industry and aggregates, the source and quantity of the products is variable in location and the destinations for those products are more numerous, therefore assessing their market destinations is more difficult.

Mining

The capacity of the specially designed trucks and trailers for hauling ore will likely be 40 tonnes or greater (note – tonnes refer to metric tonnes; i.e. 2,205 pounds). Ore will be hauled 365 days a year. It is important to consider that the estimates of hauling time for mine trucks that haul this ore are best-case estimates at average mine production. Weather and road conditions, truck maintenance schedules, transportation of mine backfill, road maintenance, and mine production will all affect the number of trucks on the road each day.

Aggregate

The aggregate industry in Marquette County is a critical supplier to the timber and mining industries as well as the private sector. Aggregate producers transport sand, gravel, stone, and rock in large tractor-trailer rigs, often using tandem trailers. Woodland Road will provide access to the active railroad for transporting aggregate and large construction stone to more distant markets. Large excavating equipment is utilized for road construction and maintenance in the Project Service Area. Borrow pits are numerous in the area and haulage trucks, excavators, loaders, crushers, conveyors, bulldozers, fuel trucks, and maintenance/service vehicles are all encountered. Woodland Road will provide improved access to get manufactured road gravel into the Project Service Area for upgrading the main/primary logging roads. The cost of aggregate products is directly proportional to the haulage distance from the source of the product to its end destination, therefore the most direct route will lower costs.

Forest Products

Forest products are typically transported on flatbed trailers (logs/pulp) and in enclosed trailers (wood chips). The equipment used in logging operations is also hauled on large tractor-trailer rigs using low-boy trailers. There is a substantial amount of equipment involved in logging operations, as previously described in this document. Good road access to timber harvest sites for loggers is an important factor in the prices received by landowners for their timber.

The key to the analysis of the benefits to be derived by the logging industry in Marquette County from the proposed Woodland Road lies in the evaluation of the market destinations and haul routes for wood products to the buyers. Timber harvested in the Project Service Area is hauled to the destinations shown in Table 1 for use, further processing, or sale. Figure 3 shows the routes that loggers use to reach the timber markets described in Table 1 for timber harvested in the Project Service Area.

Presently, timber harvested north of the steep grade just south of the Yellow Dog River is hauled out on Triple A Road to the east via CR 510 to CR 550 and then south into Marquette to US-41. An estimated 90% of the timber using this route must then travel west on US-41 through Marquette, Negaunee, and Ishpeming to market destinations. Only about 10% of the timber is hauled to mills east or south of Marquette (Figure 3, Table 1). If Woodland Road was constructed, the large volume of westbound logging truck traffic would no longer have to travel through the cities of Marquette, Negaunee, and Ishpeming.

Timber harvested generally south of the Mulligan Creek area (which is south of the steep grade mentioned in the previous paragraph that presently prohibits logging truck access) is hauled out to the south, either by connecting via private logging roads to Wolf Lake Road and then south to US-41 or traveling the Dishno Road to Peshekee Grade (CR 607) and then south to US-41. This road network is presently not adequate to meet the needs of the forest industry and significant public safety concerns exist. Incidents between logging vehicles and the public are common on these narrow and winding roads and trails.

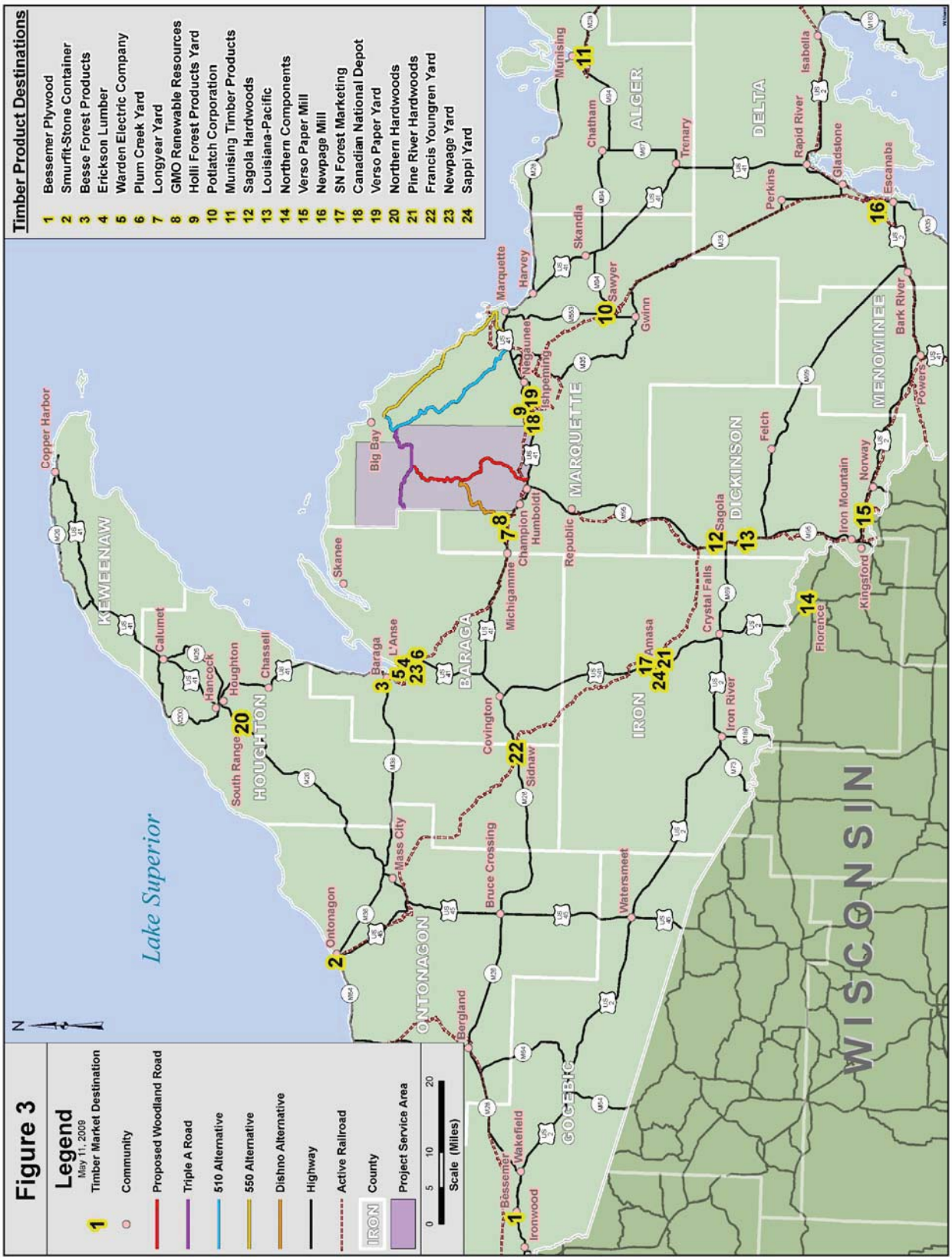
Recreation

As previously described, recreation traffic is presently significant in the Project Service Area and the construction of Woodland Road is expected to increase recreational use. Improved landowner access is another important attribute of the proposed road.

Table 1. Summary of the Timber Market Destinations from the Project Service Area

Market Destination	Location	Figure 3 Location #	Hauling Route
Bessemer Plywood	Bessemer	1	US-41 to M-28 West
Smurfit-Stone Container	Ontonagon	2	US-41 West to M-38
Besse Forest Products	Baraga	3	US-41 West
Erickson Lumber	Baraga	4	US-41 West
L'Anse Warden Electric Company, LLC	L'Anse	5	US-41 West
Plum Creek Yard	L'Anse	6	US-41 West
Longyear Yard	Michigamme	7	US-41 West
GMO Renewable Resources	Champion	8	US-41 West
Holli Forest Products Railroad Yard	Ishpeming	9	US-41 East
Potlach	Sawyer	10	US-41 East to M-553 South
Munising Timber Products	Munising	11	M-28 East
Sagola Hardwoods	Sagola	12	US-41 to M-95 South
Louisiana-Pacific	Sagola	13	US-41 to M-95 South
Northern Components	Florence, WI	14	US-41 to M-95 South
Verso Paper	Quinnesec	15	US-41 to M-95 South to US-2 East
Newpage	Escanaba	16	US-41 to M-95 South to M-69 SE to US-2
SN Forest Marketing, Inc.	Amasa	17	US-41 West to US-141 South
Canadian National Depot-Railroad Yard	Ishpeming	18	US-41 East
Verso Paper-Ishpeming Railroad Yard	Ishpeming	19	US-41 East
Northern Hardwood	South Range	20	US-41 West to Houghton to M-26 South
Pine River Hardwoods	Amasa	21	US-41 West to US-141 South
Francis Youngren (Hill Creek) Railroad Yard	Sidnaw	22	US-41/M-28 West to M-28 West
Newpage Railroad Yard	L'Anse	23	US-41 West
Sappi Railroad Yard	Amasa	24	US-41 West to US-141 South

Figure 3: Map of the Timber Markets and Routes.



Alternative 2. CR 550

Alternative 2 is the CR 550 route (Figure 2). The route would be from the intersection of the proposed Woodland Road and US-41 (at CR FY) then east on US-41 to Wright Street to Sugar Loaf Avenue to CR 550 to CR 510 to the north terminus on Triple A Road. The length of this alternative is 60.4 miles.

None of Triple A Road or CR 510 segments in this alternative route are all-season roads by MCRC standards, nor is all of CR 550 an all-season road, which restricts haulage during the late winter/early spring when load or weight restrictions are imposed. The all-season road specification is generally 3.5 inches of bituminous pavement, 8 inches of processed road gravel, and 24 inches of sand. During this time of weight restrictions on public roads, which lasts an average of about 2 months each spring, axle-weight loads must be reduced by 35% and speed limits for trucks are reduced. It is MCRC policy that if any county road is reconstructed in Marquette County the road must be constructed to all-season road design standards. Therefore, if this alternative is selected or required, all of the roads that are reconstructed must be constructed to all-season road design standards and spring weight restrictions would not be an issue for trucks. The all-season road standards include road base requirements and a minimum of 3.5 inches of bituminous paving.

Preliminary road design plans have been prepared by AL&S for the Triple A Road and CR 510 portion of this alternative route. Utilizing this route would require the upgrading (i.e. widening, revised alignments, etc.) of Triple A Road and CR 510, which are presently sand or sand/gravel-surface roads in this area. The East Branch Salmon Trout River crosses Triple A Road three times and runs close to the road as the stream and road traverse down the steep grades in a valley (Photograph 1). The stream is at the toe of the road slope (or within 50 feet of the road) for a cumulative distance of about 560 feet on the east side of Triple A Road and 280 feet along the west side of the road, for a total of 840 feet.

Photograph 1. East Branch Salmon Trout River adjacent to Triple A Road.

To maintain adequate horizontal alignment of the road (i.e. adequate curve radii and site distances) the existing road would need to be reconstructed. Upgrading the Triple A Road to meet the minimum safety and design grades and to provide more isolation for the East Branch would necessitate replacement of three stream crossings with longer culverts. In some areas where the stream is located parallel to the present road or is close to the toe of the existing road embankment (as shown in Photograph 1), widening the road would necessitate relocation of the stream. This segment of the route would involve the reconstruction of three stream crossings and would require the relocation or enclosure of 600 feet of the East Branch Salmon Trout River in four separate locations; two segments of 50 feet each and two segments of 250 feet each. The relocation or enclosure of the four stream segments (i.e. 600 feet) would ensure that future impacts to the stream from sedimentation or direct road runoff are reduced compared to leaving the stream directly adjacent to the toe of the road slope. In addition, the replacement of another stream crossing structure on the Triple A Road would be required to cross an unnamed stream approximately two miles northeast of the East Branch Salmon Trout crossings, bringing the total of the stream crossing structures on this portion of the route to four.

Portions of the Triple A Road and CR 510 have long steep grades; part of the Triple A Road is located in a valley along with the East Branch Salmon Trout River. Construction measures to ensure soil erosion and sedimentation protection during construction and operation would be extensive. Reconstruction of Triple A Road in the areas where it is in close proximity to the East Branch Salmon Trout River (a designated trout stream) would likely provide significant positive ecological benefits to the East Branch well into the future.

Photograph 2. Straw bales placed along Triple A Road at one of the East Branch Salmon Trout River crossings.

The CR 550 alternative haul route would be partially through the City of Marquette. Transportation of ore, timber, and aggregate and the associated service traffic in the quantities expected over an extended time period in urbanized areas may not be the optimal option for the City of Marquette or the local residents. Truck traffic in and through the City of Marquette has become a significant issue to City residents and a concern to truckers. The Marquette City Commission has prohibited certain truck traffic on historic truck routes within the City. Future truck routes are undecided at this time. The Marquette City Commission is expected to enact ordinances in the near future that will limit or prohibit hauling by trucks on certain City routes. These anticipated limitations may affect the trucking of ore, timber, and aggregates to/from the Project Service Area and transporting equipment and other supplies. Citizens from the Village of Big Bay, the City of Marquette, and those that live along or near County Road 550 have requested through signed petitions that an alternate route for truck traffic be found.

Also this CR 550 route also travels through the Northern Michigan University campus (Figures 4 and 5). Ore transport trucks alone are expected to make an average of 50 round trips per day with a peak of up to 75 trips per day through the more congested traffic areas. Logging truck traffic, based on known haulage in recent years, is expected to be approximately 1,700 round trips during the 8-month period when most timber is transported to markets via CR 550. Aggregate haulers would add to this traffic, as would all of the service and employee vehicles associated with these industries. Cumulatively this would be a substantial amount of daily traffic on the CR 550 route, including large tractor-trailer trucks, smaller service trucks, and passenger vehicles.

The Marquette Area Public Schools and Negaunee Public Schools have school bus routes on CR 550 during the school year. The bus routes extend north past the CR 550-CR 510 intersection into the Village of Big Bay and extend south to Wright Street. The significant increase in large truck traffic as well as Project Service Area-related traffic (employees, contractors, suppliers, etc.) on CR 550 would create traffic safety concerns that would have to be addressed if this alternative is selected or required.

Transportation on public roads related to the commercial operations would take its toll on the condition of the roads and require ongoing maintenance by the MCRC and the Michigan Department of Transportation (MDOT). The length of travel on public roads would be a factor in maintenance costs as well, and the CR 550 alternative would involve substantially more miles of public road travel than the preferred alternative, as is explained later in this document. One goal of the proposed project is to have the mining, logging, and aggregate haulers off the well-traveled public roads in more urbanized areas to the extent possible for public safety. The CR 550 alternative certainly does not accomplish that purpose.

The cycle time for logging trucks hauling forest products harvested in the north portion of the Project Service Area (i.e. generally north of the high terrain south of the Yellow Dog River) is an important factor in evaluating the CR 550 alternative. It is known that hauling on the CR 550 route for all forest products destined for mills described in Table 1 and shown in Figure 3 is highly inefficient, impacts urbanized areas, and is clearly not the optimal option when compared to the proposed Woodland Road alternative. Use of the existing transportation routes clearly impairs the efficiency and profitability of the logging industry to get its timber to markets when compared to the Woodland Road.

Aggregate haulers would have similar inefficiencies and impacts associated with the CR 550 route as do the mining and forestry products industries with their transportation.

Figure 4. Aerial Photograph of CR 550 in Marquette (East Part).

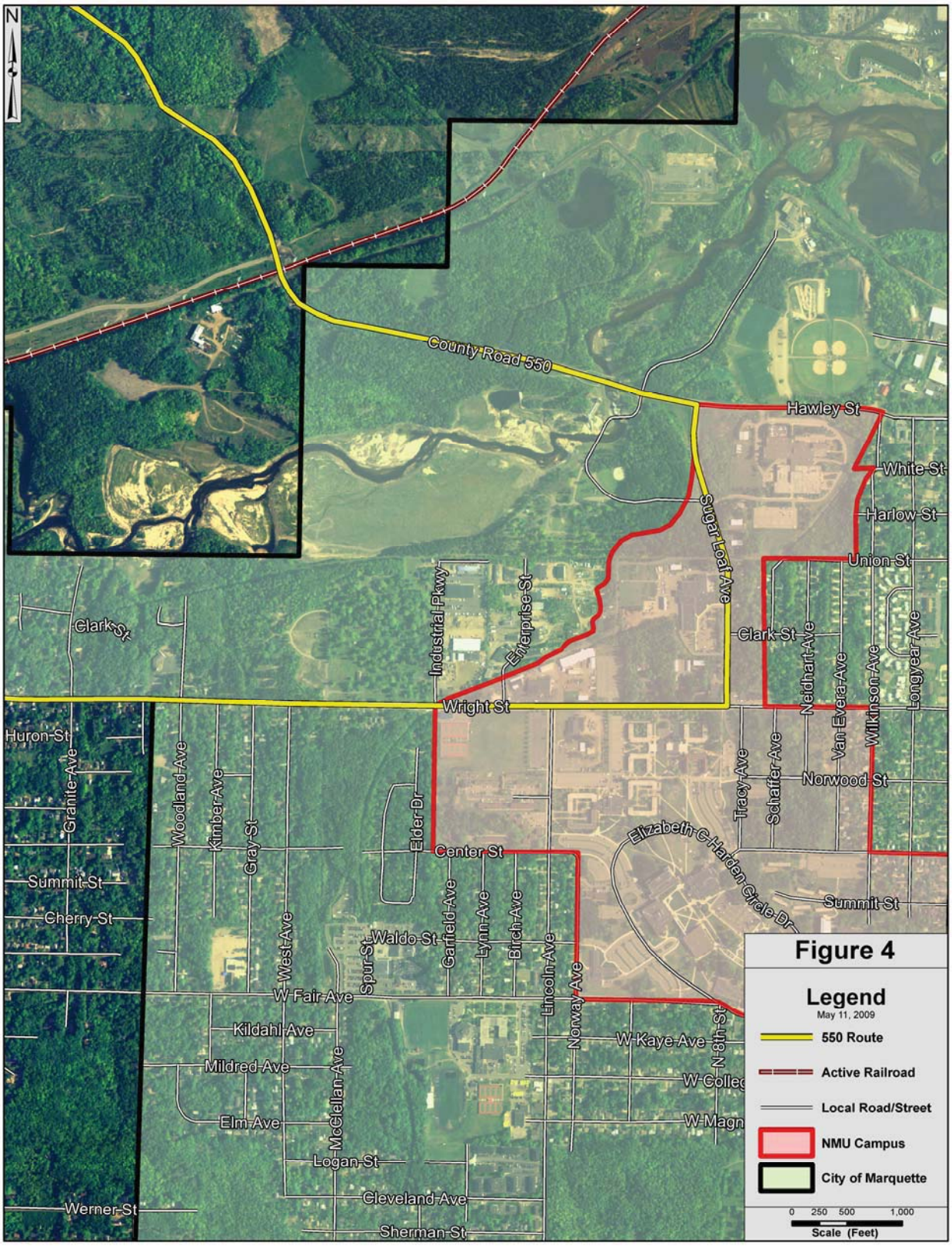
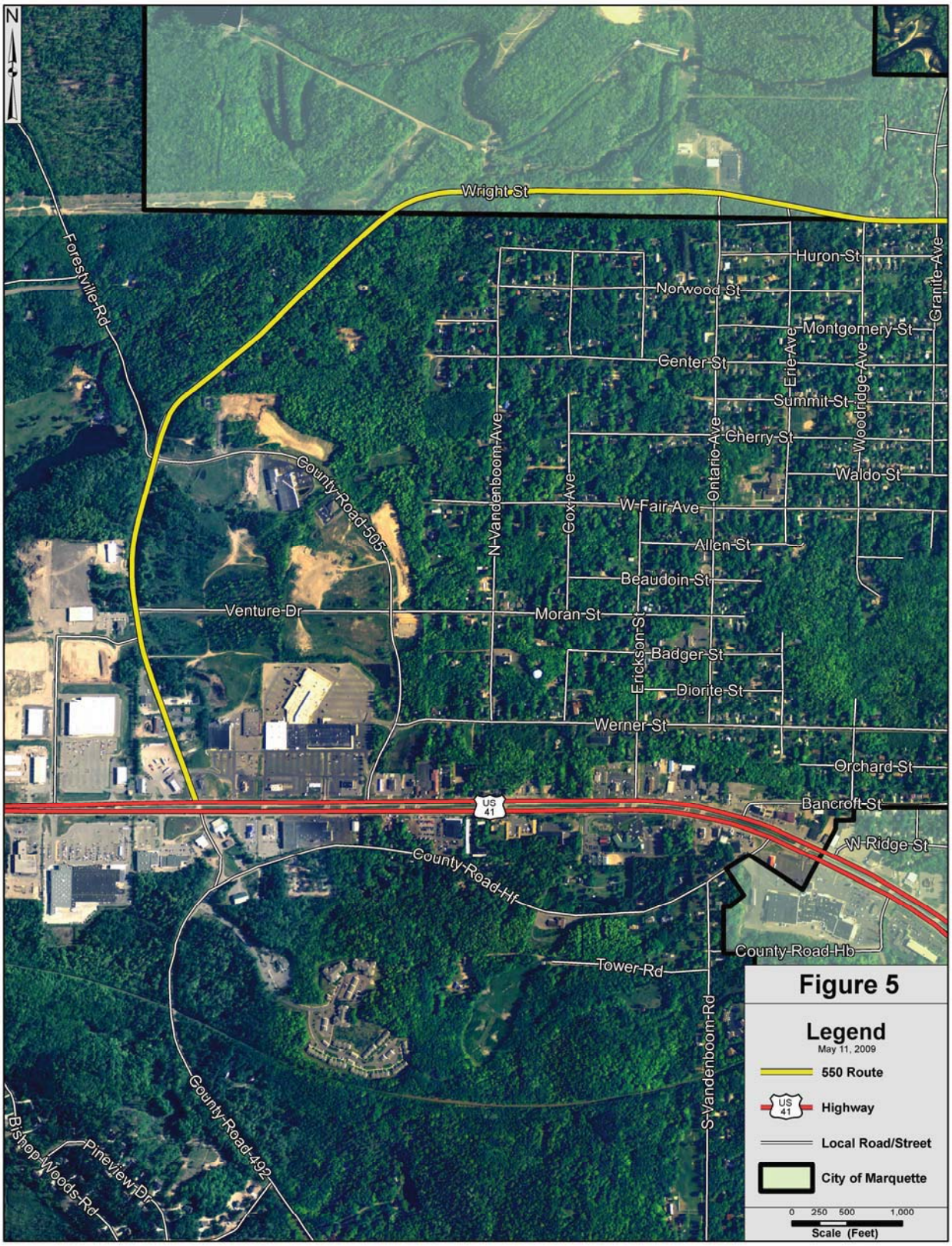


Figure 5. Aerial Photograph of CR 550 in Marquette (West Part).



Wetland impacts for the CR 550 alternative associated with the reconstruction of Triple A Road, CR 510, and CR 550 have been evaluated. Actual wetland delineations were not done on these routes, but available wetland inventory information was used to determine the approximate wetland impacts. Due to the fact that the existing CR 550 is of sufficient width and additional right-of-way would not be required to upgrade the road to all season design standards and new wetland impacts will not be substantial, the wetland impacts were evaluated for the Triple A Road and CR 510 portion of this route only. New bridges may be required over Alder Creek, Little Garlic River, and Big Garlic River on CR 550.

Wetland impacts for reconstruction of Triple A Road from the north terminus to CR 510 (9 miles) and for CR 510 to CR 550 (3.1 miles) were estimated to be 0.4 acre. The route would involve the reconstruction of four stream crossings and would require the relocation of 600 feet of the East Branch Salmon Trout River in four separate locations; two segments of 50 feet each and two segments of 250 feet each.

Note that the wetland impacts are considered approximate for the CR 550 alternative due to the lack of actual on-ground wetland delineations. The Woodland Road alternative had actual on-ground wetland delineations conducted and wetland acreages are very accurate and exceeded the acreage of wetlands depicted on the NWI. Therefore, wetland impacts of the CR 550 alternative are probably underestimated due to the fact that NWI was used to estimate wetland impacts and actual delineations were not conducted for this alternative.

Emissions

Certain gases in the atmosphere absorb and emit radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. Common greenhouse gases in the Earth's atmosphere include water vapor, carbon dioxide, methane, nitrogen oxides, ozone, and chlorofluorocarbons. Emissions from motor vehicles that discharge these chemical compounds into the atmosphere are an important factor to evaluate for this proposed project.

For this analysis only emissions from mine ore transport trucks were assessed. The fleet of trucks that will be used to transport ore will be new and the emissions data are known for these trucks. Trucks used to transport timber, logging equipment, aggregate, and related service vehicles are a diverse fleet of older and newer trucks and accurately estimating the emissions is not feasible. However, the comparison of emissions for the four primary alternatives for ore transport trucks provides an accurate and relative comparison of this important factor in the analysis. When the emissions from the logging, aggregate and other trucks are considered for each alternative the total emissions will be greater.

The amount of carbon dioxide (CO_2), the suite of gasses known as nitrogen oxides (NOx), sulpher dioxide (SO_2), and particulate matter that would be discharged into the atmosphere for alternatives 2, 3, 4, and 6 has been estimated for this assessment. The estimate was based upon a number of factors that are pertinent to the proposed project, including the type of vehicles that will use the road, the emissions from these vehicles, the miles traveled, engine horsepower, truck speed, and other pertinent factors.

Alternative 2 (CR 550) is the longest route through urbanized areas of all of the alternatives. Emissions that will be discharged into the air is second-highest for the four alternatives considered and a portion of those emissions will be in populated areas. The estimate of the

amount of emissions for the CR 550 alternative is 7,218 tons of CO_2, 8.4 tons of NOx, 122 pounds of SO_2, and 844 pounds of particulate matter per year (Table 2).

Evaluation of Alternative 2 (CR 550)

The primary benefit of the CR 550 alternative is the small amount of wetland impact (0.4 acre). In balancing of the benefits and drawbacks of the CR 550 alternative the drawbacks of this alternative overwhelm the benefits.

The most significant drawbacks to the CR 550 alternative are:

- Length of the route (60.4 miles);
- Air emissions are second-highest of the four alternatives evaluated;
- Impacts to public roads, especially in more developed/urban areas;
- Upgrades to existing roads that would be necessary to allow all-season travel;
- Potential short-term impacts of the Triple A Road upgrades to the East Branch Salmon Trout River, including relocation or enclosure of about 600 feet of the river;
- The proximity of substantial portions of the route to existing residential, commercial, and educational developments; and,
- Residents' requests for alternative truck routes in and around the City of Marquette.

Although this route would result in the least wetland impact, the location of the route through urbanized areas, the additional length of this route compared to the proposed alternative and the resultant significant increase in costs, the increased emissions in urbanized areas, and the wasteful inefficiencies that will have to be borne for many years to come are all valid reasons that signal the need to evaluate additional alternatives. For these and other reasons stated in the discussion of this alternative, the CR 550 alternative is deemed not to be the optimal alternative. However, the 550 Alternative is the route that will be used if a more prudent alternative is not constructed.

Alternative 3. CR 510

Alternative 3 is the CR 510 route (Figure 2). The route would be from the intersection of the proposed Woodland Road and US-41 (at CR FY) then east on US-41 to Midway Drive (CR 502) to CR 510 north to the north terminus on Triple A Road. The length of this alternative is 51.2 miles. This alternative route has similarities with the CR 550 alternative, but does not involve travel in the City of Marquette. CR 510 connects with US-41 in Marquette Township west of Marquette but trucks traveling west on US-41from the intersection of Midway Drive would pass through the cities of Negaunee and Ishpeming.

Due to the MCRC road reconstruction policy, if this alternative is selected or required, all of the roads that are reconstructed must be constructed to all-season road design standards. Triple A Road, Midway Drive (CR 502), and CR 510 are not all-season roads.

Preliminary road design plans have been completed by AL&S for the CR 510 alternative. The project would require the upgrading (i.e. widening, revised alignments, etc.) of Triple A Road, which is a sand or sand/gravel-surface road, in the same manner as would be required in the CR 550 alternative. Substantial portions of CR 510 would have to be upgraded to address horizontal and vertical road alignment issues (i.e. steep grades, tight curves, and inadequate sight distances), narrow widths, and an inadequate road foundation for large trucks. Road widening and realignment would result in impacts to wetlands and streams.

Wetland impacts for reconstruction of Triple A Road from the north terminus to CR 510, a distance of 9 miles, were estimated to be 0.4 acre. This segment of the route would involve the reconstruction of four stream crossings (i.e. three on the East Branch Salmon Trout River and one on an unnamed stream) and would require the relocation or enclosure of 600 feet of the East Branch Salmon Trout River in four separate locations; two segments of 50 feet each and two segments of 250 feet each.

Preliminary design plans for the reconstruction of CR 510 from the intersection with Triple A Road south to the intersection of US-41, a distance of about 23 miles, would require the replacement of 52 stream crossing structures and would impact an estimated 28 acres of wetlands. The project would require the relocation or enclosure of the following streams: 170-foot segment on Lost Creek; 500-foot segment of a tributary of the Big Garlic River; and 6,000 feet of the Big Garlic River and its tributaries are located essentially in the roadside ditches of CR 510, which would likely necessitate relocation as part of the road reconstruction. In a one mile stretch of CR 510, the Big Garlic River or its tributaries cross CR 510 six times.

Thus, the total approximate impacts for the CR 510 alternative are 29 acres of wetlands, 56 stream crossings, and relocation of potentially over 7,200 feet of four different streams. This extent of likely stream relocations is a significant consideration in evaluating this alternative due to the impacts on the streams.

As explained in the CR 550 alternative, the wetland impacts are considered approximate for the CR 510 alternative due to the lack of actual on-ground wetland delineations; wetland impacts of the CR 510 alternative are probably underestimated due to the fact that NWI was used to estimate wetland impacts and actual delineations were not conducted for this alternative.

There are important societal issues associated with the CR 510 alternative, primarily the proximity of residential development to portions of this route and the potential issues with the reconstruction of CR 510 that would need to be resolved if this alternative is implemented. More specifically, residences occur along portions of CR 510 and the use of this road by large trucks each day would likely be a concern to the owners of these homes due to issues with noise, emissions, and traffic (Figure 6). The road is mostly gravel surface and inadequate road base to withstand the volume and weight of large trucks and would require reconstruction to meet safety standards, which would also likely impact numerous private properties. The residential areas closer to US-41 would be even more severely impacted by road reconstruction and truck traffic than the lower density residential areas in the more rural areas along CR 510.

Figure 6: Aerial Photograph of CR 510 in Marquette Township.

Negaunee Public Schools have school bus routes on CR 510 during the school year. As with the CR 550 alternative, the significant increase in large truck traffic as well as other related traffic (employees, contractors, suppliers, etc.) on CR 510 if this alternative is implemented would create concerns that would have to be addressed if this alternative is selected or required.

Many of the same impacts outlined in the evaluation of the CR 550 alternative are also associated with the CR 510 alternative. Ore transport trucks alone are expected to make an average of 50 to 75 trips per day through the residential areas on this route. Logging truck traffic, based on known haulage in recent years, is expected to be approximately 1,700 round trips during the 8-month period when most timber is transported to markets. Aggregate haulers would add to this traffic, as would all of the attendant traffic for service vehicles, contractors, and employees for these commercial operations in the Project Service Area. This alternative, as well as the CR 550 alternative, would have substantially more miles of public road travel in developed/urbanized areas than the preferred alternative, as is explained later in this document. One of the purposes of this project is to have the mining, logging, and aggregate haulers stay off of well-traveled public roads in more developed or urban areas to the extent possible. The CR 510 alternative certainly does not accomplish that purpose.

Traffic congestion and delays are concerns associated with the existing intersection of Midway Drive (aka CR 502) and US-41. This segment of US-41 is four lanes wide with a center turn lane and carries a substantial amount of traffic, especially during peak morning and late afternoon travel times, and all day during the busy tourist season. Large trucks turning west (right) from Midway Drive onto US-41 may have difficulty making the entry on to US-41 and east-bound trucks waiting in the center turn lane to turn left would also probably have extended waiting time before a safe left turn could be made from US-41 to Midway Drive. In the morning, traffic using Midway Drive to enter US-41 is likely to be delayed if behind a truck.

As with the CR 550 alternative, the cycle time for logging trucks hauling forest products harvested in the north portion of the Project Service Area is an important factor in evaluating the CR 510 alternative. It is known that hauling on either the Alternative 2 or Alternative 3 routes for forest products destined for mills described in Table 1 and shown in Figure 3 is highly inefficient, impacts urbanized areas, is a traffic concern, and signals the need to evaluate a more prudent alternative.

Aggregate haulers would have similar issues associated with the CR 510 alternative route as do the mine-related and forest products industries with their transportation.

Emissions

The CR 510 alternative is the second-longest route through urbanized areas of all of the alternatives, however the emissions for ore transport trucks using the CR 510 alternative are the highest of the four alternatives evaluated for emissions. A portion of those emissions will be in populated areas. The estimate of the amount of emissions for the CR 510 alternative is 7,424 tons of CO_2, 8.7 tons of NOx, 126 pounds of SO_2, and 868 pounds of particulate matter per year (Table 2).

Evaluation of Alternative 3 (CR 510)

In balancing the benefits and drawbacks of the CR 510 alternative the drawbacks of this alternative strongly outweigh the benefits. Although the CR 510 alternative is 9.2 miles shorter than the CR 550 alternative, the impacts of this alternative are similar to the CR 550 alternative. The most significant drawbacks to the CR 510 alternative are:

- Length of the route (51.2 miles);
- Emissions are the highest of the four alternatives considered;
- Impacts to public roads, especially in more developed areas;
- The potential impacts to the East Branch Salmon Trout River from the reconstruction of portions of Triple A Road would be the same with this alternative route as with Alternative 2 (CR 550) and the impacts to the Big Garlic River and its tributaries;
- The substantial reconstruction of Triple A Road and CR 510 to meet road design safety requirements would impact 29 acres of wetlands, would require 56 stream crossings, and approximately 7,200 feet of stream relocations or enclosures on five different streams where the stream is located alongside CR 510 or Triple A Road would be necessary;
- As with the CR 510 alternative, the proximity of substantial portions of the CR 510 route to existing residential development creates societal issues; and,
- Traffic congestion issues on US-41 and county roads are an important consideration with this alternative.

In the comparison of alternatives, the CR 510 alternative is clearly not the optimal route when considering the public interest, 7,200 feet of stream relocations, and 29 acres of wetland impacts. The additional length of this route, the resultant significant increase in transportation costs, the highest level of emissions, and the wasteful inefficiencies that will have to be borne for many years to come are all valid reasons that signal the need to evaluate a more prudent alternative.

Alternative 4. Dishno Road/CR 607

Alternative 4 would be from US-41 on CR 607 (Peshekee Grade) to Dishno Road to Trail 5 to the north terminus on Triple A Road (Figure 2). The length of this alternative, if continuing on US-41 to the proposed intersection with Woodland Road, is 27.9 miles. As is the case with the CR 550 and CR 510 alternatives, the existing county road portion of this route is not all-season road, which would restrict haulage during the late winter/early spring period, and the roads would have to be constructed to meet all-season road standards.

Utilizing this route would require the reconstruction of the entire route until its confluence with US-41. Widening and revised alignments of the road would be necessary, as determined by preliminary construction plans prepared by AL&S. Wetland impacts for the Dishno Road/CR 607 alternative have been estimated to be 33 acres, with 29 stream crossings and 800 feet of

stream relocation or enclosure required, with over 3,000 feet of existing roadway where a stream is located immediately adjacent to the side of the road.

The road reconstruction may be problematic due to the number of private property owners on this route compared to the proposed route and the presence of Van Riper State Park, through which part of the route is located. The number of land owners involved would make obtaining additional right-of-way easements or acquisition for this route very difficult. If key property owners do not wish to provide easements or sell all/part of their property to allow reconstruction of the road, then route planning would not be possible.

An important consideration with the Dishno Road/CR 607 route alternative is the length of the road that travels along the Dishno Creek and the Peshekee River. The road was historically located along the streams to take advantage of the flatter terrain, as was discussed in Alternative 1 for the railroad. However, upgrading the existing road where the road parallels the streams is determined to be undesirable due to road runoff directly entering the streams, wetland impacts in close proximity to streams that could negatively impact aquatic habitat, and the potential for accidents given the predicted 50 to 75 round trips per day for ore transport trucking in addition to logging and aggregate trucks on the route, along with the related employee, service vehicles, and general public traffic. Widening the road near streams would also significantly affect the feasibility of this route because of the presence of bedrock ridges/outcrops in some locations.

The reconstructed road for this alternative would be within 100 feet of the Peshekee River for a total distance of about 13,050 feet in 10 different sections. The sections where the road and river are in this close proximity to each other vary in length from 100 feet to 4,000 feet. The road in this alternative would also be within 100 feet of the Dishno Creek for a total length of about 5,150 feet in eight segments varying in length from 100 feet to 2,200 feet. In total, the Dishno Road/CR 607 alternative would be within 100 feet of the Peshekee River and the Dishno Creek for a total of 18,200 feet, or almost 3.5 miles. The impacts to the streams and the aquatic life therein due to the road being in such close proximity is difficult to determine, but the noise, ground vibration, runoff of road salt, dust accumulation, emissions, and stormwater runoff are all likely to be negative effects.

In addition, this alternative would require the relocation or enclosure of about 800 feet of the Dishno Creek in order to allow reconstruction of the road to provide a safe alignment. The presence of substantial areas of bedrock outcrops constrict the road design and necessitate the stream being relocated or enclosed in three areas in order to reconstruct the road. The lengths of the three relocations are 335 feet, 425 feet, and 40 feet. Stream relocations can be accomplished with minimal downstream effects if done properly, but some impacts to fish and macroinvertebrates are unavoidable. Stream enclosures are generally considered more problematic for aquatic life.

As explained in the previous alternatives, the cycle time for logging trucks hauling forest products harvested in the Project Service Area that would be served by the Dishno Road/CR 607 alternative is an important factor in evaluating this alternative. An important distinction with the Dishno Road/CR 607 alternative is that the proposed route would serve timber hauling for the portion of the Project Service Area north of the Mulligan Creek highlands (i.e. Yellow Dog Plains) as well as the timber lands south of Mulligan Creek. The CR 550 and CR 510 alternatives would only serve timber harvesting in the Yellow Dog Plains and would do nothing to serve transportation south of Mulligan Creek because there is no passable road for trucks through the highlands north of Mulligan Creek to the Yellow Dog Plains.

The number of loads of timber transported from the Project Service Area on the Dishno Road/CR 607 route, based on known haulage in recent years, is expected to be approximately 1,700 round trips during the 8-month period when most timber is transported to markets. Transportation of timber from the north portion of the Project Service Area would be served by the Dishno Road/CR 607 route as well as the areas south of Mulligan Creek, not just the north portion as is the case with the CR 550 and CR 510 alternatives. Hauling forest products destined for mills described in Table 1 and shown in Figure 3 is likely to have similar efficiencies with the Dishno Road/CR 607 alternative as would the proposed Woodland Road alternative because both of these routes would provide access to the Project Service Area north of Mulligan Creek.

A large percentage of the forest products hauled from the Project Service Area is hauled south on M-95 or west on US-41 (Figure 3). As such, the Dishno Road/CR 607 route and the Woodland Road route provide similar efficiencies of hauling, although the Dishno route to its intersection with US-41 is about 5.6 miles longer to the M-95 intersection than the proposed Woodland Road route. Truck traffic turning right on M-95 from US-41 coming from the west (Dishno route) may be somewhat of an advantage compared to trucks making a left turn on M-95 from the center turn lane on US-41 when coming from the east (Woodland Road). The Dishno Road/CR 607 alternative is significantly more efficient in serving the transportation needs of the Project Service Area than the CR 550 or CR 510 alternatives.

The Dishno Road/CR 607 alternative would not have the level of potential societal impacts associated with the previous two alternatives (CR 550 and CR 510), but is located through a portion of the Van Riper State Park. Development in proximity to the existing road is relatively sparse, but once on US-41 east-bound and south-bound truck traffic will have to travel through the Village of Champion and also the intersection of US-41 and M-95 at Koski Corners. While the 50 round trips per day just for the ore transport traffic will be on US-41 through the Village of Champion, the noise associated with the additional truck traffic may affect some residents. Logging trucks westbound on US-41 from CR 607 will not travel through the Village of Champion, but trucks headed to mills south on M-95 would travel through the Village.

The impacts of the truck traffic on the US-41/M-95 intersection would be primarily from the potential traffic congestion and delays. Ore transport, aggregate, or logging trucks coming from the west would make a right turn to go south on M-95 to their destinations. North-bound trucks returning to the Project Service Area from M-95 would have to make a left turn on US-41 from M-95, which could cause traffic delays as trucks wait to turn. Traffic may be slowed during the busier times of the day/year (e.g. summer) as large trucks would slowly accelerate once they turn west onto US-41.

Aggregate haulers would have similar benefits and drawbacks associated with the Dishno Road/CR 607 alternative route as was described for mine-related hauling and forestry products transportation.

Emissions

Emissions for ore transport trucks using the Dishno Road/CR 607 alternative are not as significant as the emissions for the CR 550 alternative or for the CR 510 alternative primarily because of the shorter route. The location of the Dishno Road alternative being in a relatively undeveloped area with very low population also helps to minimize the direct impacts of the emissions on people. The estimate of the amount of emissions for the Dishno Road/CR 607

alternative is 4,124 tons of CO_2, 4.8 tons of NOx, 70 pounds of SO_2, and 482 pounds of particulate matter per year (Table 2). As such, the emissions for the Dishno Road alternative are approximately 43% less than the CR 550 alternative, 44% less than the CR 510 alternative.

Evaluation of Alternative 4 (Dishno Road/CR 607)

The Dishno Road alternative route is 27.9 miles in length. While most of the route would be located on existing roads and trails, the road would have to be reconstructed to meet safety and road design standards from US-41 to the north terminus on Triple A Road. The notable benefits of the Dishno Road/CR 607 route is that the route does not impact urbanized or residential areas, with the exception of the Village of Champion and residences along US-41 that are probably somewhat accustomed to traffic on the highway, and emissions are substantially reduced for this alternative compared to the CR 550 and CR 510 alternatives.

Although the Dishno Road/CR 607 alternative route is 32.5 miles shorter than the CR 550 alternative and 23.3 miles shorter than the CR 510 alternative, there are significant undesirable effects to this alternative. The most significant detriments to the Dishno Road/CR 607 alternative are:

- The natural resources impacts of the reconstruction of the Dishno Road and CR 607 required in order to implement this alternative would be primarily wetland and stream impacts;

- Wetland impacts (33 acres) are the most of any alternative and are 1.9 acres more than the proposed Woodland Road alternative;

- The number of stream crossings on the Dishno Road/CR 607 alternative (29) is more than the proposed Woodland Road (23) and the location of the Dishno Road/CR 607 road being within 100 feet of the Peshekee River and Dishno Creek for a distance of about 3.5 miles is a significant detriment; and,

- The need to relocate about 800 feet of the Dishno Creek to allow the reconstruction of the road plus streams being located next to the road for over 3,000 feet are important considerations due to the potential negative impacts to aquatic life.

The societal impacts are not as great as the CR 550 or CR 510 alternatives because the Dishno Road/CR 607 route is not in close proximity to existing development, but there would be impacts to residents in the Village of Champion and development along US-41 from additional truck traffic on the highway, as well as potential impacts to Van Riper State Park. Traffic issues on US-41 and M-95 are likely to be a concern, especially during the summer.

The natural resources impacts associated with the relocation of 800 feet of Dishno Creek, as well as the reconstructed road being within 100 feet of the Peshekee River for 2.5 miles and for nearly one mile on Dishno Creek, as well as this alternative having the highest wetland impacts, deem this alternative not prudent or feasible. In addition, the likely difficulties with obtaining easements from the numerous landowners along the route and the Van Riper State Park issue substantially reduce the feasibility of this alternative. For these reasons and others stated in the discussion of this alternative, the Dishno Road/CR 607 alternative is deemed not to be a feasible or prudent alternative.

Alternative 5. Mulligan Truck Trail

This alternative utilizes the Mulligan Truck Trail for access to the Project Service Area. By locating the route in the Mulligan Plains some of the area of more severe topographic relief located south of the Yellow Dog Plains could be avoided. However, a Conservation Easement is in place on the north end of the Mulligan Plains at the Yellow Dog River, Sections 21 and 28, T50N-R28W that precludes using this route (Appendix A).

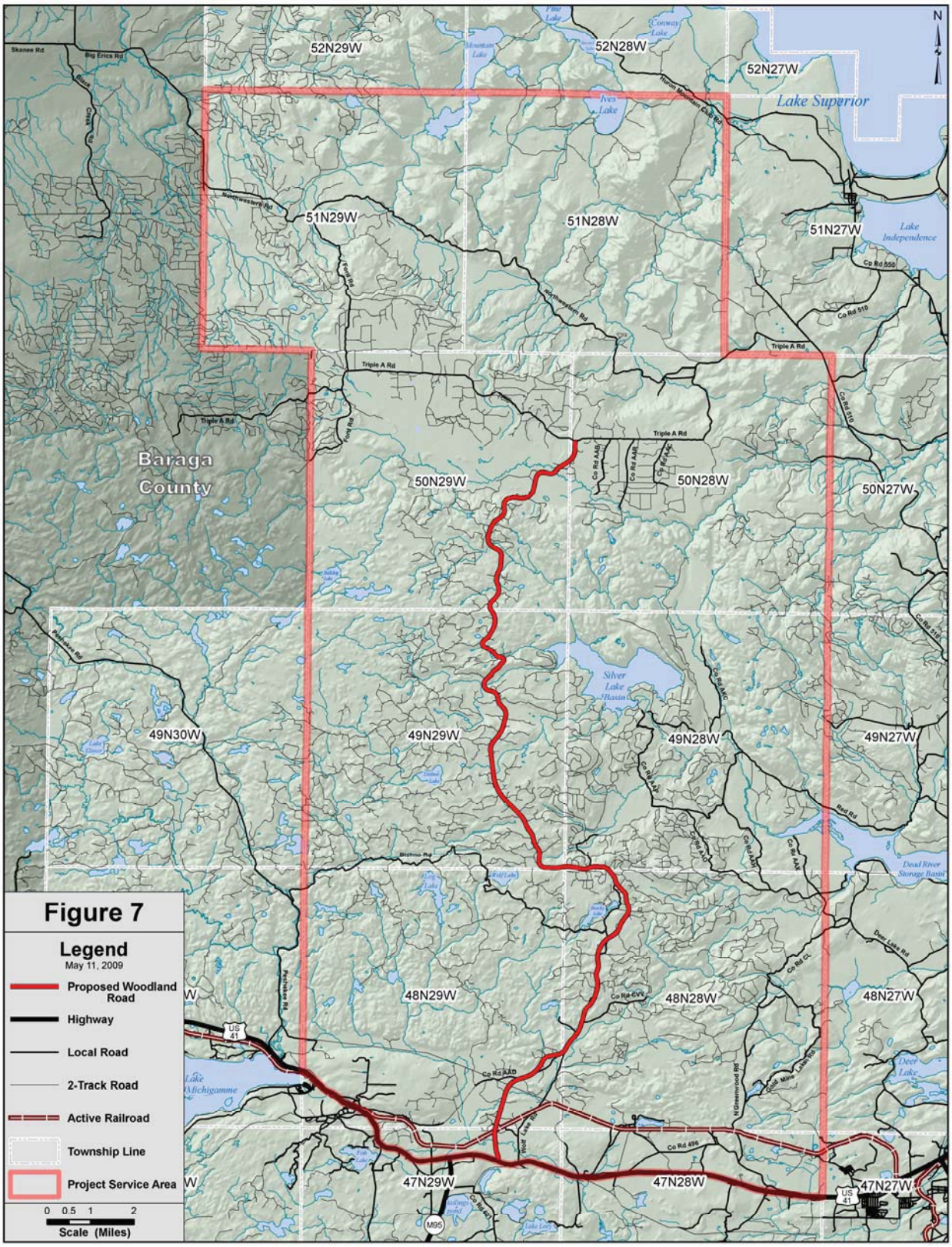
Alternative 6. Woodland Road

The Woodland Road route involves the use of existing roads and trails and some new road locations that would be generally described as follows: from the intersection of CR FY and US-41, then north on a new route to a point north of the intersection of CR AAD and Wolf Lake Road, then on Wolf Lake Road to a point south of Brocky Lake where the route will bypass Brocky Lake area development to the east, and then on Wolf Lake Road again to Trail 5 and generally on Trail 5 north to the north terminus on Triple A Road (Figure 2). The length of the Woodland Road alternative is about 22.3 miles. The route is primarily across lands owned by large timber companies with substantial use of logging roads and trails and some use of existing county roads.

The Woodland Road alternative is located and designed to minimize the impacts of the road on existing development, to minimize natural resources impacts to the extent practicable, and to be economically viable in serving all of the transportation needs of the Project Service Area. County roads and numerous logging roads from two-tracks to two-lane gravel roads to paved sections all presently exist from US-41 north to Triple A Road. This is not a “roadless” area. Existing roads are used to the extent that it is feasible in this alternative. Figure 7 depicts a portion of the existing network of roads in the Project Service Area and shows that the proposed Woodland Road is located in a corridor where numerous small roads presently exist and avoids other more roadless areas. This is an important fact to consider when assessing wildlife impacts and habitat fragmentation.

For the most part the existing roads in this alternative are not of adequate width and alignment to meet the safety design standards that are necessary for the proposed Woodland Road and reconstruction of most of the proposed route would be necessary. To create the necessary horizontal alignment of the road and provide minimum safe sight distances some curves will have to be straightened. For proper vertical alignment hills will have to be cut down or areas of low topography filled to create a road grade required for safe operation and grades of less than 6%, although some segments of the route on the steep slopes north of Mulligan Creek are about 8% slopes and speeds of loaded southbound trucks will be reduced. If the road design can be accomplished within the existing road right-of-way where the route is on existing county roads, additional right-of-way will not be required. However in some cases realignment will be required to meet design standards, to improve stream crossing alignments, or to avoid/minimize wetland impacts and will necessitate adding to the existing right-of-way or acquiring new right-of-way.

Figure 7. Map of the Existing Road Network in the Project Service Area.



The logging industry that receives timber from the Project Service Area would significantly benefit from the construction of the proposed Woodland Road, not only in northwest Marquette County but in other locations of the U.P. Not only would the timber companies benefit from the proposed road, but loggers, haulers, service providers, and many related businesses would benefit from the greatly improved access to timberlands. The Michigan Forest Products Council, a member of the Woodland Road LLC, has endorsed the proposed Woodland Road route due to the significant benefits of the road to the forest industry.

The improved access for large enclosed trailers (chip vans) would potentially result in additional forest products being marketed, such as wood chips that can be used at the former K.I. Sawyer air base for production of fuel briquettes, for chip-board products, or other uses. Presently poor road alignments and road conditions in the Project Service Area severely limit access by chip-vans and essentially make chipping uneconomical. A chip van requires longer turning areas due to the length of the van trailer when compared to shorter log trailers and pup trailers used to haul pulp, bolts, and saw logs.

The proposed Woodland Road would serve to substantially improve the flow of timber to markets in the Western U.P. and move many logging trucks off public and private roads that are not presently suited to this type of traffic. Connecting the lands north of Mulligan Creek via Woodland Road to US-41 would divert a substantial volume of logging-related truck traffic from urbanized areas of Marquette, Negaunee, and Ishpeming and would provide a much more direct route to the primary timber markets in the Western U.P. as previously shown on Figure 3.

Loggers must presently haul loads out from the area north of the Mulligan Creek to the east on Triple A then on CR 510 and CR 550 through Marquette and west on US-41 through Negaunee and Ishpeming. When some trucks return empty from L'Anse, Baraga, or Ontonagon, they travel on the Skanee Road (Baraga County) to Big Eric's Road to Northwestern Road to Ford Road to reach the Triple A Road. This return route is approximately 40 miles shorter than the CR 550 route and some loggers use this route with loaded trucks. The proposed Woodland Road would provide the north-south link in the Project Service Area and substantially improve the access of forest products harvested north of the Yellow Dog River to market destinations.

Starting at the north terminus on Triple A Road, length of the proposed Woodland Road is 38.1 miles shorter than the Triple A Road-CR 510-CR 550-US-41 route through Marquette, Negaunee, and Ishpeming west to the intersection of CR FY. The length of the Dishno Road/CR 607 alternative to the intersection of the proposed Woodland Road and US-41 at CR FY is 27.9 miles and is 5.6 miles longer than the proposed Woodland Road route. The shorter length of Woodland Road when compared to the other alternatives, especially CR 550 and CR 510, will save the logging industry many thousands of miles of travel each year. As a result, emissions from trucks will be reduced, fuel costs would be significantly lower, and the miles that these trucks travel on the busier public roads in Marquette County would be reduced as well. Most important to landowners is that timber values may increase as a result of these hauling efficiencies.

Timber Company Market Destinations

As presented in Table 1 and Figure 3, the major timber companies that own land in the Project Service Area haul most of the harvested timber either south on M-95 or west on US-41 to market destinations or yards. Only about 10 percent of the harvested timber is hauled east, mostly on M-28 to Munising or south to Escanaba. Woodland Road would provide a much more efficient transportation route for timber harvested in the Project Service Area and would avoid

having to haul the logs harvested on lands north of the Yellow Dog River on the Triple A Road-CR 510-CR 550 route and through Marquette to go west on US-41 to the primary markets. For logging operations south of Mulligan Creek, Woodland Road would provide a much more efficient and safer route for transport of logging equipment and harvested timber south and west to the mills.

Public and Private Land Logging

There is substantial acreage of public and non-timber company private land in the Project Service Area that is also managed for timber production. The U.S. Government (Ottawa National Forest) does not conduct logging operations in the Cyrus McCormick Experimental Forest. The State of Michigan owns a sizeable acreage of lands in the area that are logged on a management rotation similar to the timber companies. Most private lands are also managed for timber production and logged when timber is mature. It is assumed that most of the timber products from harvests on these public and private lands go to the same markets and in similar proportion to those described for the timber companies in the preceding discussion. Having Woodland Road available for these logging purposes will similarly benefit the public and private landowners.

Loggers

Another substantial beneficiary of Woodland Road will be the loggers; the small and not-so-small companies that conduct the actual harvests on all of these forest lands on contracts obtained through bidding. Saving significant hauling costs by using the more efficient route offered by Woodland Road will allow the loggers to save fuel, wear and tear on equipment, and save time. Instead of suffering high overhead costs such as fuel, truck maintenance, and labor, loggers will be able to reduce costs due to logging and hauling efficiencies. The loggers may also expand their operations to include chipping or other harvest methods that will be available to them due to the construction of Woodland Road and as new markets become available (see below).

Bio-fuel Production Plant Project

A bio-fuel production facility in has been initiated in Marquette County. This facility will produce biofuel cubes for use in industrial boilers and furnaces, including the Marquette Board of Light and Power and the Tilden and Empire mines. It is expected that 150,000 tons of bio-fuel cubes will be produced annually at this facility. Forest products will be required to produce the cubes at the onset; material such as wood chips, saw dust, shavings, or forest residue will be converted into the bio-fuel cubes. Other materials such as crop residue and crops grown for the project such as switch grass may add to the raw materials used in the plant eventually.

The presence of this bio-fuel plant near Marquette makes the construction of Woodland Road even more important to the forest products industry in Marquette County. As mentioned previously, Woodland Road will allow better access to logging areas by chip vans, which will allow chipping of harvested tree tops presently left in the woods and will provide a viable raw material for the bio-fuel facility and will more efficiently maximize the use of the timber produced. Depending on prices, some pulp may be chipped and sold to the bio-fuel plant instead of sold to paper mills, which provides more diversity of markets for timber owners.

Emissions

Emissions from trucks will be substantially reduced in the Marquette/Negaunee/Ishpeming area as a result of the construction of Woodland Road as compared to the CR 550 or CR 510 alternatives. This is due to the following facts:

- Woodland Road will provide the most efficient and shortest route for transporting commercial products to or from the Project Service Area to market destinations;

- By substantially reducing the number of miles traversed by large trucks in the urban areas of Marquette, Negaunee, and Ishpeming, emissions will be proportionately reduced; and,

Emissions for the proposed Woodland Road are estimated to be 3,300 tons of CO_2, 3.9 tons of NOx, 56 pounds of SO_2, and 386 pounds of particulate matter per year (Table 2). Emissions for the Woodland Road alternative are about 54% less than the CR 550 alternative, 56% less than the CR 510 alternative, and 20% less than the emissions attributed to the Dishno Road/CR 607 alternative (Table 2).

Evaluation of Alternative 6 (Woodland Road)

The Woodland Road alternative is significantly shorter than the CR 550 and CR 510 alternatives and is 9.6 miles shorter than the Dishno Road/CR 607 alternative. There are substantial benefits to selection of the Woodland Road alternative for this project. The benefits are:

- Provides a multi-purpose road to serve the mining, logging, and aggregate industries as well as tourism and recreation industries and the general public in northwest Marquette County and takes significant heavy truck traffic off public roads in more urbanized areas to the greatest extent practical;

- Emissions will be substantially lower with the Woodland Road alternative compared to the CR 550 and CR 510 alternatives;

- Minimizes impacts to existing public road infrastructure;

- Changes transportation routes and patterns for timber companies taking timber from harvest areas to market destinations;
    - substantially improves hauling efficiency;
    - reduces operating costs;
    - removes heavy logging truck traffic originating in the Project Service Area from urbanized areas;
    - provides potential opportunities for additional wood products to be economically marketed (e.g. wood chips for the bio-fuel plant, ethanol production, etc.); and,
    - should result in higher timber prices to landowners.

- Woodland Road is the most direct route alternative from US-41 to Triple A Road, which is an important long-term consideration for efficient access;

- Savings in transportation costs, depending on the alternative compared, would be substantial also save businesses millions of dollars in reduced overhead for labor, fuel,

new trucks, and maintenance when compared to the extra miles of transportation in the other alternatives. These cost savings directly equate to a more viable economic climate for these businesses that are vital to the central U.P.; and,

- No road maintenance costs for the Marquette County Road Commission.

The proposed Woodland Road would minimize or avoid the negative effects of the previously discussed alternatives, such as:

- Societal impacts from large truck traffic through developed areas;
- Proximity of the road to streams and necessary stream relocations;
- Substantially higher emissions; and,
- Issues associated with the longer travel routes on public roads and streets.

Approximately 31.3 acres of wetland impacts would result from the implementation of the Woodland Road alternative and 23 stream crossings would be necessary. No stream relocations or enclosures are needed.

The Woodland Road alternative would provide the shortest practicable route from US-41 to Triple A Road to serve the mining, timber, and aggregate industries. The logging and aggregate industries would greatly benefit from the construction of Woodland Road because the road would provide a much more efficient route for transportation of timber to regional markets. Aggregate producers and suppliers would benefit with the more direct route for transporting aggregate for the commercial and private clients in the Project Service Area.

Societal impacts would be minimal with the Woodland Road alternative because traffic congestion and noise would be minimized by this alternative. Areas of development such as camps and residential areas have been avoided or impacts minimized by the location of the proposed route. Concerns about emissions would be reduced, due to the substantially shorter route.

The Woodland Road route is clearly the most feasible and prudent alternative for access to the Project Service Area. Natural resources impacts have been avoided or minimized to the extent practicable and unavoidable wetland impacts will be mitigated to ensure a *net gain* of wetland resources as well as preserving important upland, wetland, and stream habitats as a result of this project, as explained in later sections of this document.

As demonstrated in this document, the benefits of the proposed Woodland Road alternative strongly favor its selection as the best alternative route. The next section provides a more detailed comparison of the critical factors associated with each of the alternatives considered.

Comparison of Alternatives

A comparison of the six alternatives demonstrates that Alternative 6, the proposed Woodland Road, is the most feasible and prudent alternative that meets the project purpose. A comparison of the alternatives is provided to show the substantial differences in the alternatives

and the reasons to select the Woodland Road alternative as the best alternative when considered under the guidance of Part 303, as well as Section 404 of the Clean Water Act.

Alternative 1: Railroad

Due to the very limited uses provided by a railroad (Alternative 1), the significant wetland and stream impacts that would be caused by the construction of a railroad, the presence of the Conservation Easement on the Matthews property, and the impacts to natural resources for providing roads to meet the remaining necessities of access not provided by a railroad for commercial activities in the Project Service Area (e.g. employee access, maintenance, fuel, etc.), the railroad alternative is clearly not feasible or prudent when compared to the remaining alternatives and has not been given further analysis or consideration.

Alternative 5: Mulligan Truck Trail

The Mulligan Truck Trail (Alternative 5) has also not been given further analysis or consideration due to the presence of the Conservation Easement on the Matthews property near the Yellow Dog River prohibiting construction of the haul road to the north terminus on the Triple A Road on this route. Although the general location of the alternative route and brief analysis of the benefits/detriments of the route have been provided, a determination of wetland impacts, stream crossings, and other environmental factors have not been evaluated in any detail due to this alternative clearly not being feasible, prudent, or possible given the presence of the Conservation Easement.

Comparison of Alternatives 2 (CR 510), 3 (CR 550), 4 (Dishno/CR 601), and 6 (Woodland Road)

The length of Woodland Road from US-41 to the north terminus on Triple A Road is 22.3 miles, which is 38.1 miles shorter than the CR 550 alternative, 28.9 miles shorter than the CR 510 alternative, and 5.6 miles shorter than the Dishno/CR 607 alternative. The other comparisons of the proposed Woodland Road alternative with the three other alternatives are provided below and shown in Table 2.

The primary comparisons between the CR 550, CR 510, Dishno/CR 607, and the Woodland Road alternative routes are:

- Wetland impacts are estimated (using NWI) to be 0.4 acre for the CR 550 route; 29 acres for the CR 510 route; 33 acres for the Dishno/CR 607 route; and are known by actual delineation to be 31.09 acres for the Woodland Road;

- There are 4 stream crossings on the CR 550 alternative (plus new bridges may be required over Alder Creek, Little Garlic River, and Big Garlic River on CR 550); 56 stream crossings on the CR 510 alternative; 29 stream crossings on the Dishno/CR 607 alternative; and 23 stream crossings for the Woodland Road alternative;

- There are 600 feet of stream relocations or enclosures that would likely be required for the CR 550 alternative; relocation of potentially over 7,200 feet of four different streams for the CR 510 alternative; over 3,000 feet of stream relocations for the Dishno/CR 607 alternative; and no stream relocations or enclosures for the proposed Woodland Road alternative;

- No travel through urbanized areas with the Woodland Road or Dishno/CR 607 alternatives; both CR 550 and CR 510 routes are through urbanized areas of Marquette, Ishpeming, and Negaunee for products to reach destinations; and,

- Emissions are substantially lower for the Woodland Road and Dishno/CR 607 alternatives compared to the CR 550 and CR 510 alternatives; the amount of the emissions being in proximity to urbanized areas for the latter alternatives is a strong detriment.

The economic impacts are astounding when comparing the alternatives (Table 2). The Woodland Road alternative would save 3,810 miles *per day* and 1,391,000 miles *per year* for the transportation of ore alone compared to the CR 550 alternative, assuming 50 round trips per day and 365 transportation days per year.

Compared to the CR 510 alternative, a total of 2,890 miles *per day* and 1,055,000 miles *per year* in ore transportation alone would be saved by using Woodland Road. The Dishno Road/CR 607 alternative is 960 miles *per day* and 350,000 miles *per year* in additional ore transportation compared to the Woodland Road route.

As a direct result of the reduction in miles traveled with the proposed Woodland Road route just for mining operations, emissions, noise, dust, road maintenance, and potential for accidents would all be reduced substantially with the implementation of the Woodland Road alternative if for no other reason than the sheer number of miles added by the other alternatives.

Transportation mileage estimates for the four alternative routes for the timber industry and for aggregate suppliers are more difficult to assess than for mining because of the fact that the number of trips on an annual basis for timber and aggregate is variable, but estimates for timber transportation have been provided in this document based upon harvest estimates. Transportation of timber in the Project Service Area varies annually according to the location of timber harvests and the size and timing of the harvests. What is known is that timber being transported from the Project Service Area to the regional markets is much more efficient using Woodland Road than any other alternative and substantially minimizes impacts of trucking through urbanized areas.

Table 2. Comparison of Alternatives for Important Attributes of Mining.

Alternative #/Name	Length[1]	Annual Ore Trans. Miles[2]	Δ Ore Trans. Miles Compared to Woodland Road	Wetland Impacts (acres)	Number of Stream Crossings and Relocations (in feet)		Emissions			
							CO_2 (tons/ year)	NOx (tons/ year)	SO_2 (lbs./ year)	PM[3] (lbs./ year)
Alt. 2 CR 550	60.4 miles	2,205,000	1,391,000	0.4	4	600	7,218	8.4	122	844
Alt. 3 CR 510	51.2 miles	1,869,000	1,055,000	29	56	7,200	7,424	8.7	126	868
Alt. 4 Dishno/CR 607	27.9 miles	1,019,000	205,000	33	29	3,000	4,124	4.8	70	482
Alt. 6 Woodland Road	22.3 miles	814,000	0	31.09	23	0	3,300	3.9	56	386

[1] Measured from the US-41/County Road FY intersection to the Trail 5/Triple A Road intersection (north terminus).
[2] Assumes 50 trips/day and 365 transportation days per year; 730,000 tonnes per year production.
[3] Particulate matter.

Emissions are a significant consideration for this proposed project given the substantial increase in emissions that would result if the CR 550 or CR 510 alternatives were selected or required, particularly when considering that a large part of the emissions will be in urbanized areas. The impacts of the increase in emissions of CO_2, NOx, SO_2, and particulate matter that would result if the CR 550 or CR 510 routes are implemented are important considering the role some attribute to these emissions in causing global warming. Hydrocarbon emissions are also public health concerns, especially for elderly people and those with respiratory illnesses. From the emission levels estimated for these alternatives, the proposed Woodland Road alternative is clearly the best alternative for that important factor.

Although the cost of construction of the Woodland Road is a factor, it has not been a significant consideration used in the evaluation of alternatives for this permit application. The direct and indirect costs to the public associated with the Woodland Road alternative are substantially less than the costs for the other alternatives. The alternative of using public roads in urbanized areas (e.g. using CR 510, CR 550, Wright Street, Sugar Loaf Avenue, and US-41) for transportation of ore, for mine access and services, and for serving the forest industry and aggregate suppliers is not the optimal alternative due to truck emissions, traffic congestion, and noise.

Table 2 clearly shows the important factors of the road route alternatives, specifically the mileage and emissions associated with transportation for mining, as well as wetland and stream impacts associated with each alternative that was considered in this application for permit. The proposed Woodland Road is clearly the most feasible and prudent alternative for meeting the project purpose.

Detailed Analysis of the Proposed Woodland Road Alternative

It must be emphasized that literally thousands of hours of both field and office time have been spent on the evaluation of numerous sub-alternatives and alignments of the Woodland Road alternative. Route alternatives within the Woodland Road alternative were evaluated for locating the road. Some major and many minor reroutes were considered. The following factors were considered in the analysis of the various route alternatives for the Woodland Road:

1. Avoid/minimize wetland impacts – cross wetlands at narrow points and use existing roads where otherwise feasible;

2. Minimize new stream crossings – cross at existing roads where safe road alignments and other factors allow;

3. Avoid indirect impacts to camps and lakefront areas;

4. Avoid steep rock outcrops or narrow deep valleys when possible;

5. Consider snow removal as a primary issue with road design and location (heavy lake-effect snow area generally north of Brocky Lake);

6. Use existing county roads where use will not affect existing development and other factors are favorable;

7. Reduce grades to 6% or less, where possible;

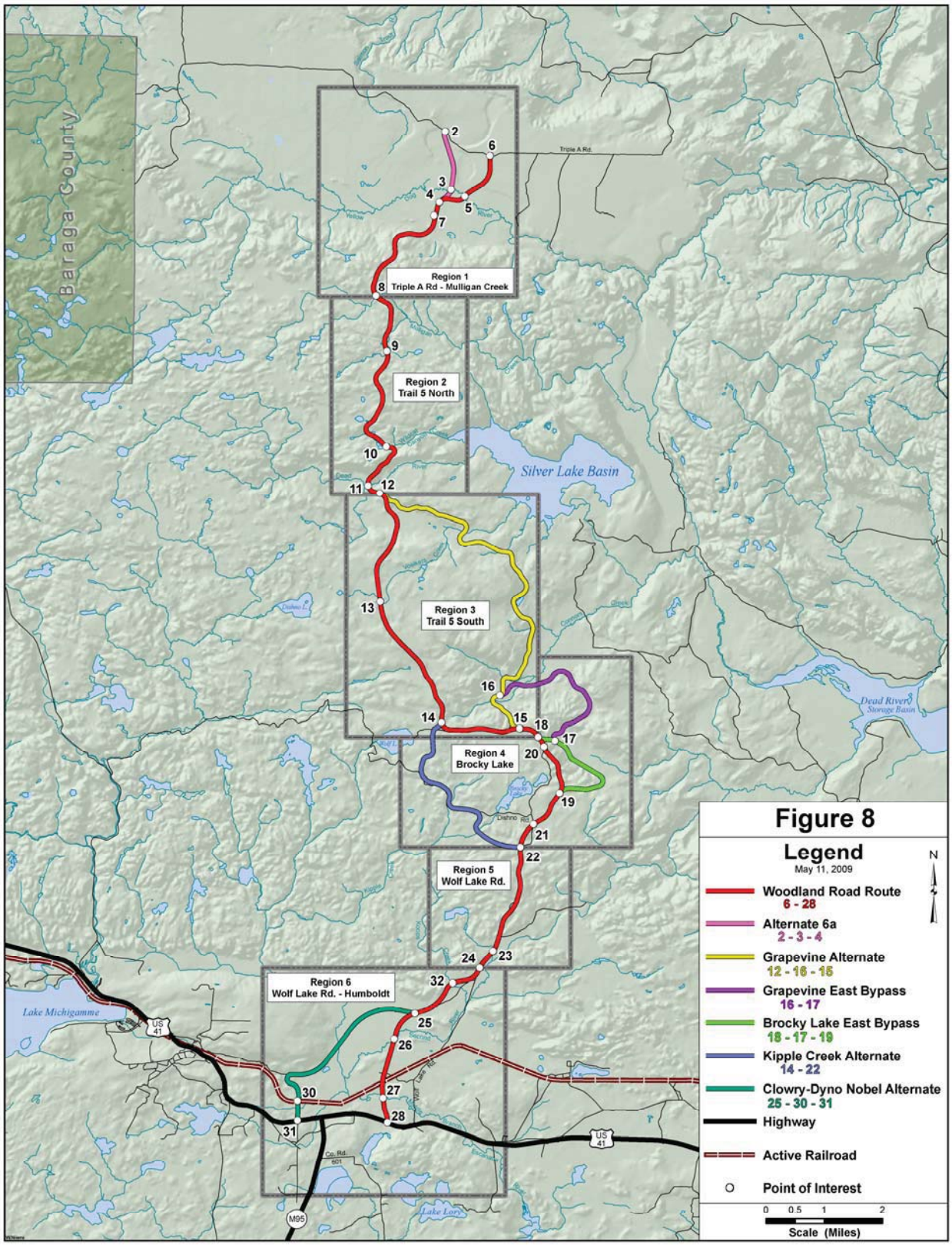
8. Avoid sharp curves, especially at the bottom of grades, which are hazardous for trucks and other traffic traveling either way; and,
9. Provide stormwater runoff diversions or other best management practices to protect streams and wetlands from sedimentation.

Woodland Road Route Alternatives

Many “route alternatives” were evaluated in the design of the proposed Woodland Road. In order to discuss the Woodland Road route alternatives, the general area of the Woodland Road has been divided into six regions starting at the north terminus on Triple A Road (Figure 8). Locations on the proposed Woodland Road and the alternative routes are described and referenced in this section of the document as numbers 1-32 and are also shown on Figure 8.

Please note that the stream crossings listed for each region described in the following text are only the primary stream crossings; the smaller stream crossings are not listed.

Figure 8. Alternatives Evaluated for the Proposed Woodland Road Route.



Region 1: North Terminus on Triple A Road to Mulligan Creek

Stream crossings: Yellow Dog River and Mulligan Creek

Region 1 of the Woodland Road (Figure 8) extends from the north terminus on Triple A Road (6) then south over logging roads and new segments of road to Mulligan Creek (8). New segments of road are proposed because they provide better alternatives for safety, design, topography, less wetland impact, shorter distance, and better stream crossing alignment.

The north portion of Region 1 extends over relatively flat sandy soils from the north terminus (6) to the Yellow Dog River (5) to the bottom of the steep grade at the common section line of Sections 23 and 24 (7), a distance of three miles. An alternative was studied for the segment of road crossing the Yellow Dog River that left the Trail 5 snowmobile trail at (4) and would cross the Yellow Dog River (3) approximately 400 feet upstream of the existing one-lane bridge on Trail 5 (5). This route was rejected primarily due to wetland impacts compared to minimal wetland impacts on the proposed route, which crosses the Yellow Dog River at the existing bridge crossing (5) and proceeds across State of Michigan land to the north terminus with the Triple A Road (6). If access is denied across the State of Michigan land, then the various other alternatives for this road segment will have to be revisited, all of which will have more wetland impact than the route across the State land, which has no wetland impacts.

The existing bridge over the Yellow Dog River (5) is not adequate for future truck hauling and is inadequately sized for storm flows and causes backwater upstream of the bridge; water flows over the road south of the right abutment during annual spring snowmelt (Photograph 1). When this bridge was constructed, sand and rock fill was apparently placed into the river floodway to accommodate the short span of this salvaged bridge. When the new bridge over the Yellow Dog River is constructed, the old bridge will be removed and the original river banks will be restored. Photographs 2 and 3 on the next page show the Yellow Dog River upstream and downstream of the proposed crossing.

Photograph 1. View northerly showing water flowing across the trail road south of the existing Yellow Dog River bridge (in background) in T50N-R29W, Section 13. September 2007.

Photograph 2. Stream sampling location upstream of the proposed crossing of the Yellow Dog River. June 2008.

Photograph 3. Stream sampling location downstream of the proposed crossing of the Yellow Dog River. June 2008.

The south segment of Region 1 extends from the Section 23/24 line (7) south to Mulligan Creek (8) and is approximately 1.7 miles in length. This part of Region 1 traverses the most diverse terrain on the entire route, comprising bedrock outcrops and steep grades. This segment crosses Mulligan Creek and some small tributary streams.

The existing Mulligan Creek crossing is located at a relatively narrow part of the wetland. There is a narrow timber bridge located at this crossing, but the bridge appears to have been washed out at some time in the past (Photograph 4). The bridge is still used as a snowmobile crossing and other recreational vehicles cross Mulligan Creek by driving through the water. A proposed new bridge structure will be located approximately 200 feet upstream of the present crossing (8) and has been designed to pass the 100-year flood event through a clear span over Mulligan Creek. This road alignment is necessary to eliminate sharp curves that would be present if the route followed the existing trail road.

Photograph 4. Existing bridge over Mulligan Creek, view northerly. October 2007.

Photographs 5 and 6 on the next page show Mulligan Creek upstream and downstream of the proposed clear-span bridge stream crossing.

Photograph 5. Stream sampling location upstream of the proposed crossing location of Mulligan Creek. June 2008.

Photograph 6. Stream sampling location downstream of the proposed crossing location of Mulligan Creek. June 2008.

Region 2: Trail 5 North

Stream crossings: Unnamed tributary to Mulligan Creek, Wildcat Canyon Creek and Dead River.

Region 2 on the proposed Woodland Road (Figure 8) extends from Mulligan Creek on Trail 5 (8) south to the intersection with Grapevine Road (12). Region 2 is 4.6 miles in length.

According to the MDEQ, the proposed crossings of the unnamed tributary to Mulligan Creek (9) and Wildcat Canyon Creek (10) have less than one square mile of drainage area above the crossings. The existing road crossing of Wildcat Canyon Creek is immediately downstream of an old beaver dam that impounds several acres of water (Photographs 7, 8, and 9). The proposed road will be located downstream of the existing crossing and will preserve the beaver dam and the impoundment because of their inherent value to wildlife and fish. The existing road surface of the section will be abandoned, removed, and revegetated.

Photograph 7. Wildcat Canyon Creek crossing, view north. May 2008.

Photograph 8. Existing Wildcat Canyon Creek road crossing, view upstream. May 2008.

Photograph 9. Existing Wildcat Canyon Creek road crossing, view downstream. The proposed road will be through this area. May 2008.